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was perhaps the escape of nocturnal enemies. A comparison is here made with the familiar instinct of feigning death.

A comparison is likewise made between sleep and hysteria, the latter condition being characterized as 'an abnormal exaggeration of the reactions of defensive mental inhibition.'

A 'biological' theory of sleep (using the former word, as Claparède has done, in its narrower sense) obviously does not stand in any necessary contradiction to a purely physiological theory. Nor does Claparède make this contention. The phenomenon which is interpreted by him as an instinctive act of defensive inhibition might well have, as its proximate cause, a condition of cerebral anæmia or of hyperæmia, or the disseveration of certain neurones, or any one of the numerous other causes which have been offered in explanation of sleep. Each of these hypotheses must be disposed of on its own merits, as indeed the author has endeavored to do. A complete explanation of sleep will, however, take into consideration its physiological and chemical concomitants as well as its 'biological' significance. In the meantime Claparède has done a service by his attempt to affiliate sleep with various other biological phenomena, even though these latter are themselves far from being well understood.

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A Motor Theory of Rhythm and Discrete Succession. R. H. STETSON. *Psychological Review,* July–September, 1905. Pp. 250–270, 293–350.

The experience of rhythm in music, verse, dancing, waving a baton, or listening to a series of uniform sounds like the ticks of a clock, is explained by the subject carrying on continuous rhythmic movements. This is the extreme form of the motor theory which Stetson adopts. Other advocates of the theory have allowed some place to mental images, to tension without movement, or to organic rhythms of the circulation or nervous system. These are specifically excluded by Stetson. The paper is an elaboration of brief suggestions published in 'Rhythm and Rhyme' (Monograph Supplement of *Psychological Review,* IV., 453–466). The main purpose is to apply the theory to definite rhythms. The experimental data consist of records and measurements of voluntary rhythmic movements of the baton, fingers, and foot while listening to a sound-series or unaccompanied. The paper tacitly assumes that the movements voluntarily made will represent the conditions in the perception of rhythm when the movements are involuntary. My study of the latter makes me hesitate to accept such a conclusion. How far volition changes the involuntary group-movement remains an important question.

The analysis of the voluntary rhythmic movement-cycle is admirably done and aids materially in applying the motor theory. The movement-cycle corresponding to the rhythmic group consists primarily of a beat-stroke and a back-stroke. It is usually complicated by auxiliary movements of smaller muscles which provide the subordinate elements in the group. The action of the muscles is of the ballistic type described by Richer; one set of muscles contracts while its opposing set relaxes.

Having started the beat, the main positive set relaxes during the first half of the beat-stroke. This contraction-relaxation is the cue for the negative set to contract, as is shown by the fact that the back-stroke is not altered by the intervention of an obstacle after the contraction of the positive set. The beat-stroke changes abruptly into the back-stroke when the cue for the negative set to contract has been returned from the nerve center. The back-stroke, on the other hand, rounds off slowly into the next beat-stroke as the muscles tend to become poised. The velocity of the beat-stroke is two to three times that of the back-stroke, its duration is independent of the tempo of the rhythm and of the length of the stroke. The back-stroke alone is subject to regulation after it starts. The only rhythmic form larger than the unit-group for which the motor theory can serve is the phrase. This is not modeled after the smaller group, as has been supposed, but is a form of movement with a rise in the central part and decline at the end. In reciting verse or singing, the phrase becomes a single act of expiration. The pause after the phrase is non-rhythmical and of indefinite length. There is no priority in the genetic development of different rhythmic forms; but the dactyl resembles the trochee and the anapest, the iamb. The spondee is not recognized as a group-form. The movement-cycle in the rhythms of speech includes the diaphragm, jaw and tongue, but not the vocal cords. Pitch, therefore, has no function in the rhythm. The vocal cords are incapable of that reciprocal movement united with a sudden blow which is necessary to the rhythmic cycle.

Stetson takes issue with Meumann and McDougall as to the common classification of rhythms by their ideational content. He regards this as 'worthless.' "It is based on a hasty generalization of the relation of artistic form to artistic content, and when worked out is simply at variance with the facts. . . . The material does not war with the form and wrench it from its true proportions" (p. 252). While this contention has weight as to the undisturbed regularity of the rhythmic movement, it certainly does not affect McDougall's main point that the rhythm is weakened by the attention being attracted to factors of 'melody, harmony or rational significance.' In place of the old classifications a new one is offered on a strictly motor basis. 'Single rhythm' (verse, ticking of the clock, occupation rhythms) consists of one movement-process, contrasted with 'combined rhythm' (music and dancing) in which there are two series of movements carried on concomitantly. In music there is one series for keeping time, in which a movement is always repeated in the same way; this slow movement is accompanied by the elaborately figured rhythm of the melody which forms a distinct movement-cycle in another group of muscles. The measure differs from the unit-group in 'single rhythm' as the result of the mutual effects of the two series, the use of tempo, of tremolo-groups, and of single beats. The detailed suggestions for the interpretation of the complicated rhythms of music are a distinct advance.

The fundamental psychological problem in rhythm, why the group is experienced as a continuous unit, is held to be explained by the constantly changing tension between the positive and negative muscle sets. If the pulls of the two sets become balanced so that the movement stops, there is a break in the rhythm. This requirement of 'actual movement' appears to me to allow too little latitude for individual differences. With some subjects a continuing tension followed by relaxation might serve to preserve the rhythm. Moreover, Stetson even excludes memory images of movement. "No succession of images which are not accompanied by actual movements can give rise to a rhythm" (p. 320). I can not see why memory should be excluded from the perception of rhythm any more than from other perceptions. It would be interesting to know how Stetson would explain the perception of rhythm when the subject observes no movement and none can be detected. He says further: "The process remains one movement just as the letter in writing, the word in speaking, the complex movements in striking a chord at the piano or turning a doorknob, are all one movement." "The muscles are all contracting or relaxing in one common wave of innervation" (p. 298). Since this holds also for the perception of a rhythm of sounds, I fail to see the force of Stetson's criticism of a statement of mine. The unitary character of the group, according to my suggestion, finds an analogy in the wave of reflex movement (not movement of one muscle, as he interprets) which results from the fusion of several successive stimuli. He states that 'such a fusion might explain the *omission* of the subordinate beats, but not their grouping.' My record of the thumb-reflex shows the crest of a large wave broken into smaller waves. This seems to best demonstrate 'one common wave of innervation.'

Use is made of the action theory of Münsterberg to explain the apparent rhythmic accent in a uniform series of stimuli. The accent occurs with a stronger movement, but the vividness of the accented element is due to the stronger efferent nerve current, not to the presence of more intense kinesthetic sensations. In speculating further as to the central process during rhythm, Stetson utilizes Holt's notion of a localization center, formulated in the study of visual anesthesia during eye movements. By supposing that impulses collected in this center discharge into a motor center at certain points in the cycle, he constructs a diagrammatic plan to harmonize the explanation of rhythmic temporal displacement, anesthesia during eye movement, maximal rate of discrete succession, and the omission of notes in a rapid series of sounds.

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Die Einfühlung und das Symbol. ROBERT M. WERNAER. *Zeitschrift für Philosophie und Philosophische Kritik,* Band 126, Heft I. Pp. 29-44.

Two important distinctions are discussed in this paper: first, and briefly, that between sign and symbol; second, that between symbol and 'Einfühlung.' The author quotes from Lipps this definition of sign: "A sign is that which tells me that something else, viz., the thing signified, exists. Smoke is the sign of fire, *i. e.,* it tells me of the existence of fire." The symbol, on the other hand, according to Mr. Wernaer, has four essential components: (1) a sensible picture, (2) an inner (seelische)